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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/434,394	11/04/1999	JOHN S., YATES JR.	5231.20-4009	3898

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EXAMINER
NGUYEN BA, HOANG VU A

ART UNIT	PAPER NUMBER
2122	41

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 November 1999_.
2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-65_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-65_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on _25 January 2001_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _2.7_.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1.   This is responsive to application filed November 04, 1999, which is a
continuation of U.S. Patent Application No. 09/385,394 filed August 30, 1999.

2.   Per Applicants' request, Preliminary Amendment filed January 25, 2001 has
been entered.

3.   Claims 1-65 have been examined.

Priority

4.   Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §
120.

Information Disclosure Statement

5.   Acknowledgement is made of the receipt of the information disclosure
statements (IDS) submitted on January 25, 2001 (paper no. 2) and on June 10, 2003
(paper no. 7) were filed. The submission is in compliance with the provisions of 37
CFR 1.97. Accordingly, the information disclosure statement is being considered by
the examiner.

Drawings

6.   Acknowledgement is made of the receipt of formal drawings received on
January 25, 2001. These drawings are approved by the draftsman but objected by the
examiner because Figures 3h, 3i, 3j, 3,k do not appear to be flow diagrams as
described in the specification at page 27.

        Correction is required.

Specification

7.   The abstract of the disclosure is objected to because it contains more than 150 words. See MPEP § 608.01(b) and because it contains a typographical error at line 12: the term "references" should be changed to – reference --

Correction is required.

8.   The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objection

9.   Claims 1, 2, 4, 17, 20, 22, 23, 26, 27, 28, 30, 34, 37, 40, 42, 43, 44, 45, 46, 55 and 57 are objected to because of the following informalities:

Claim 34 (second occurrence)

Claim 34 is objected to because it is misnumbered. The misnumbered claim 34 (second occurrence) should be renumbered claim 35. Appropriate correction is required.

Claims 1 and 22

At lines 7 and 13 (claim 1) and line 4 (claim 22), the term – device(s) – should be added after "well-behaved memory" to render the claim language consistent with the recitation of the limitation "non-well-behaved memory device(s)" at line 8 (claim 1) and line 5 (claim 22).

Claims 1, 22 and 30

At line 13 (claim 1), line 7 (claim 22), line 9 (claim 30), the term – time – should be added after "execution" to render the claim language consistent with the recitation of the limitation "translation time" in the claim.

Claim 1

At line 13, the verb "references" after "found to" should be changed to – reference –

Claims 1, 17, 22, 23, 30, 40, 42 and 55

A conjunction – and – should be added at the end of the limitation preceding the last limitation of the claim.

Claims 2, 4, 26, 27, 34 (second occurrence), 43 and 44

At line 1, the term "steps" should be changed to – step – because only one step is recited in the claim.

Claim 20

At line 2, the term "path" before "to raise an exception" should be changed to – circuitry – to render the claim language consistent with the recitation of the same limitation "address translation circuitry" claimed in other claims.

Claims 28, 37 and 57

At line 2, the term "exceptions" should be changed to – exception–.

Claim 30

At line 8, the term – memory – should be added before "loads" to render the claim language clear and consistent with the recitation of the limitation "identified memory load" recited at the end of the claim.

Claim 45

At line 2, the article "an" before "the instruction" should be changed to – in – to render the sentence grammatically correct.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

10.   The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11.   Claims 6-8, 10-13, 17, 27, 29, 32-34, 36, 39, 46, 48-51, 53, 57, 59-65 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "the program" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "the object program" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "the reference implementation" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the non-well-behaved device" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 11recites the limitation "the non-well-behaved device" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the non-well-behaved device" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "the segment descriptor" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "the annotation" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 27 recites the limitation "the instruction execution circuitry" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 29 recites the limitation "the computer" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 32 recites the limitation "the reference side-effect sequence" at line 10. There is insufficient antecedent basis for this limitation in the claim.

Claim 33 and 34 recite the limitation "the difference of ordering of side-effects" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 36 recites the limitation "the device" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 39 recites the limitation "the device" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 44 recites the limitation "the instruction execution circuitry" at lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 46 recites the limitation "the individual side-effects" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 48 recites the limitation "the non-well-behaved device" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 49 recites the limitation "the segment descriptor" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 49 recites the limitation "the annotation" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 50 recites the limitation "the formed segment descriptor" at lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 51 recites the limitation "the difference of ordering of side-effects" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 53 recites the limitation "the reference implementation" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 57 recites the limitation "the instruction execution circuitry" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 59 recites the limitation "the non-well-behaved device" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 60 recites the limitation "the device" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 61, 62 and 63 recite the limitation "the difference of ordering of side-effects" at line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 64 recites the limitation "the object program" at line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 65 recites the limitation "the reference implementation" at line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 1, 17 and 55 recite the limitation "circuitry and/or software" (claim 1, line 17; claim 17, line 5; claim 55, line 6). This claim language is indefinite because it does not particularly point out and distinctly claim the scope of the subject matter of the invention. For art rejection purposes, the above limitation is being interpreted as "circuitry and software."

12.   The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13.   Claims 1, 2, 14, 22, 30, 40 and 55 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitations "well-behaved memory devices," "non-well-behaved memory devices," and "side-effects" although mentioned in the specification are not being defined or described in such a way as to enable any person skilled in the art to which it pertains to carry out the claimed invention.

Double Patenting

14.   The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a

patent and to prevent possible harassment by multiple assignees. See *In re Goodman,* 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Long,* 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1993); *In re Van Ornum,* 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel,* 422 F2.d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F2.d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminated disclaimer in compliance with 37 CFR 1.103(c) 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-65 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-47 of U.S. Patent No. 6,397,379. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reason(s):

The patented claims recite a method for translating and executing instructions for a computer of a first computer architecture on a computer of second different architecture, the method comprising, *inter alia:*

distinguishing memory loads that are believed to be directed to well-behaved memory from memory loads that are believed to be directed to non-well-behaved memory ('379 patent, claim 8a);

while executing the second representation, identifying side-effect resulting from memory reference having being believed at translation time to be directed to well-behaved memory device but that at execution time found to reference

a device with a valid memory address that cannot be guaranteed to be well-behaved ('379 patent, 8b); and

resuming execution of the translated segment of the program in the first instruction set ('379 patent, 8c).

While the instant claims (e.g., claim 1) recite additional details such as:

a.   *identifying a side-effect arising from the memory reference having been reordered by the translator;*

b.   *based on the distinguishing, identifying whether the difference in sequence of side-effects may have a material effect on the execution of the program; and*

c.   *circuitry designed to establish program state to a state equivalent to a state that would have occurred in the execution of the first representation;*

the additional detail described in a. appears to be an obvious variation of the limitation 8b of patented claim 8; the one described in b. appears to be an obvious variation of limitation 8b (e.g., the resulting well-behaved and non-well-behaved behaviors of memory devices are obvious variations of material effects on the execution of the program) of patented claim 8; and the one described in c. is deemed to be inherent to the step of resuming execution of the translated segment of the program in the first instruction set because in order to resume execution of the translated segment of the program in the first instruction set, program state that would have occurred in the execution of the first representation would have to be saved so that the program knows to which state to go back to resume the execution of the program in the first instruction set.

The instant claims thus recite an obvious variation of the invention claimed in the patented claims.

The correspondence between the instant independent claims and the patented claims is as follows:

Instant claim	Patented claim
1	4+8
2+3	4+7
14+17	4+8
22	4+8
30	4+8
40	4+8
55	4+8

Claim Rejections – 35 U.S.C. § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

16. Claims 1-65 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,031,992 to Cmelik et al. ("Cmelik").

Claim 1

Cmelik discloses at least:

a binary translator programmed to translate at least a segment of a binary representation of a program from a first representation in a first instruction set architecture to a second

representation in a second instruction set architecture, a sequence of side-effects in the second

representation differing from a sequence of side-effects in the translated segment of the first

representation, the second representation distinguishing individual memory loads that are

believed to be directed to well-behaved memory, from memory loads that are believed to be

directed to non-well-behaved memory device(s) (see at least figure 2 and associated discussion

in the specification related to code morphing software);

> *instruction execution circuitry designed, while executing the second representation,*

> > *to identify an individual memory-reference instruction, or an individual*

memory reference of an instruction, a side-effect arising from the memory reference having been

reordered by the translator, the memory reference having been believed at translation time to be

directed to well-behaved memory but that at execution found to references a device with a valid

memory address that cannot be guaranteed to be well-behaved, and

> > *based in the distinguishing, to identify whether the difference in*

sequence of side effects may have a material effect on the execution of the program (see at least

figure 2 and associated discussion in the specification related to code morphing

software); *and*

> > *circuitry and/or software designed to establish program state to a state equivalent to a*

state that would have occurred in the execution of the first representation, and to resume execution of

the translated segment of the program in the first instruction set (see at least figure 2 and

associated discussion in the specification related to code morphing software).

Claims 2 and 14

Cmelik discloses at least a method and a computer comprising circuitry (see at

least Figures 2 and 3 and related discussion in the specification) designed to *evaluat*[e]

whether an individual memory reference of an instruction references a device having a valid memory

address but that cannot be guaranteed to be well-behaved (see at least Figure 5 and related discussion in the specification).

Claims 22, 30, 40 and 55

Cmelik discloses at least:

while translating at least a segment of a binary representation of a program from a first instruction set architecture to a second representation in a second instruction set architecture, distinguishing individual memory loads that are believed to be directed to well-behaved memory from memory loads that are believed to be directed to non-well-behaved memory devices (see at least figure 2 and associated discussion in the specification related to code morphing software);

while executing the second representation, identifying a load that was believed at translation time to be directed to well-behaved memory but that at execution is found to be directed to non-well-behaved memory, and aborting the identified memory load (see at least Figure 2 and associated discussion in the specification related to code morphing software) *and*

based at least in part on the identifying, re-executing at least a portion of the translated segment of the program in the first instruction set (see at least Figure 2 and associated discussion in the specification related to code morphing software).

Claim 3

Cmelik further discloses *if the reference cannot be guaranteed to be well-behaved, re-executing the instruction in an alternative execution mode* (see at least 14:24-28).

Claim 4

Cmelik does not specifically disclose *while translating at least a segment of a binary representation of a program from a first instruction set architecture to a second instruction set architecture to produce the stream of instructions, annotating in the produced instructions memory*

loads that are believed to be directed to well-behaved memory from memory loads that are believed to be directed to nonwell-behaved memory. However, this step is deemed to be inherent in the teaching of Cmelik as Figures 2 and 10 show the trap handler which handles exceptions during the translation process. Without the inherent annotation step, the trap handling would be inoperative.

Claim 5

Cmelik further discloses *for memory references generated as part of executing a stream of instructions on a computer, evaluating whether an individual memory reference of an instruction has been reordered relative to other side-effects in a manner that materially alters the execution of a program of the memory reference* (see at least 12:31 – 14:29).

Claim 6

Cmelik further discloses *if the reference cannot be guaranteed to be well-behaved, rolling back the state of the program to a prior state* (see at least "rollback" operation described at 13:6-7 and its context described in 12:31 – 14:29).

Claim 7

Cmelik further discloses *wherein the rolling back step is initiated when an exception occurs in the object program* (see at least "rollback" operation described at 13:6-7 and its context described in 12:31 – 14:29).

Claim 8

Cmelik further discloses *resuming executing from the rolled back state, the resumed execution executing a precise side-effect emulation of the reference implementation* (see at least "rollback" operation described at 13:6-7 and its context described in 12:31 – 14:29).

Claim 9

Cmelik further discloses *wherein the device having a valid memory address has an address in an I/O space of the computer* (see at least 14:17-29).

Claim 10

Cmelik does not specifically disclose *evaluating an annotation embedded in the instruction to determine whether the reference to the non-well-behaved device is to raise an exception.* However, this step is deemed to be inherent in the teaching of Cmelik as Figures 2 and 10 show the trap handler which handles exceptions during the translation process. Without the inherent annotation step, the trap handling would be inoperative.

Claim 11

Cmelik does not specifically disclose *in circuitry embedded in an address translation circuitry of the computer, evaluating whether the reference to the non-well-behaved device is to raise an exception.* However, this step is deemed to be inherent in the teaching of Cmelik as Figures 2 and 10 show the trap handler which handles exceptions during the translation process. Without the inherent claimed step, the trap handling would be inoperative.

Claim 12

Cmelik does not specifically disclose *evaluating an annotation encoded in a segment descriptor to determine whether the reference to the non-well-behaved device is to raise an exception.* However, this step is deemed to be inherent in the teaching of Cmelik as Figures 2

and 10 show the trap handler which handles exceptions during the translation process. Without the inherent annotation step, the trap handling would be inoperative.

Claim 13

Cmelik does not specifically disclose *forming the segment descriptor by copying another segment descriptor, and altering the annotation.* However, this step is deemed to be inherent in the teaching of Cmelik as Figures 2 and 10 show the trap handler which handles exceptions during the translation process. Without the inherent claimed step, the trap handling would be inoperative.

Claims 15-21

The rejection of claim 14 is incorporated. Since claims 15-21 recite similar features of claims 3-13, the same rejections are applied.

Claims 23-29

The rejection of claims 22 is incorporated. Since claims 23-29 recite similar features of claims 3-13, the same rejections are applied.

Claims 31-39

The rejection of claim 30 is incorporated. Since claims 31-39 recite similar features of claims 3-13, the same rejections are applied.

Claims 41-54

The rejection of claim 40 is incorporated. Since claims 41-54 recite similar features of claims 3-13, the same rejections are applied.

Claims 56-65

The rejection of claims 55 is incorporated. Since claims 56-65 recite similar features of claims 3-13, the same rejections are applied.

Conclusion

17.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

18.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Antony Nguyen-Ba, whose telephone number is (703) 305-0103. The examiner can normally be reached on Tuesday - Friday from 6:15 – 3:45 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam, can be reached at (703) 305-4552.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Central Fax Number   (703) 872-9306

ANTONY NGUYEN-BA
PRIMARY EXAMINER

Art Unit 2122

March 3, 2004